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JPL may be a source of ground water pollution

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Toxic waste in northwest Pasadena ground water, which may have been caused by solvents dumped at JPL in the 1940s and 50s, could cost almost \$3 million to clean up, according to a study commissioned by the city of Pasadena.

Results of the study, which is based in part on research dating back over the last six years, implicate the Jet Propulsion Laboratory as the source of the pollution, which has forced the closure of two city of Pasadena water wells and sharply curtailed the Lincoln Avenue Water Company's use of two others.

The report stops short of conclusively fixing blame, saying only that test results are "consistent with a (pollution) source at the Jet Propulsion Laboratory."

While not explicitly admitting guilt, JPL officials Monday acknowledged that the institution's dumping in the days before the hazards of solvents were known may be the cause of the pollution. They are willing to pay almost half of the more than \$100,000 cost of the city study and another \$70,000 toward the cost of a pilot cleanup project.

"There is some evidence that their point," said Fred Felberg, JPL's Associate Director, Institutional. "Prior to about 1960, we were using septic tanks and cesspools."

Tests begun in 1980 found groundwater was contaminated with three chemicals which, if ingested in large quantities, are suspected of causing cancer: trichloroethylene (TCE), carbon tetrachloride, and tetrachloroethylene (PCE).

The chemicals were used as part of solvents in such businesses as dry cleaners and auto repair shops. JPL used them in construction of rocket components and electronic systems.

By 1985, all three surpassed legal levels. The two Pasadena wells, both in the Arroyo Seco near JPL, were shut down.

The Lincoln Avenue Water Company, however, has continued to use some water from the contaminated wells, blending small quantities of it with large quantities of more expensive water imported by the Metropolitan Water District, LAWC field superintendent Ray Rutledge said. LAWC provides water to more than 4,000 northwest Altadena residents and businesses.

The city study, conducted by James M. Montgomery Consulting Engineering Inc., found that the levels of toxic pollution in the ground water could be expected to increase to as much as 40 times the legal limits within the next 20 to 30 years. It recommends a sophisticated new treatment involving ultraviolet light and ozone as the least expensive way to clean up the mess.

But the technology is relatively new; Montgomery's engineers recommended a \$145,000 pilot project to test it.

JPL and the city will split the cost of the pilot project, with a small contribution from LAWC. If it is a success, a full-fledged ultraviolet/ozone treatment system still would cost an additional \$3 million, according to the report.

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SCIENCE WATCH

Venus Theory Queried

IN their observations of Venus, Soviet and American spacecraft have detected low-frequency radio emissions resembling those generated by lightning on Earth. Many scientists concluded that this meant there was lightning on Venus. Other scientists, taking the idea one step further, said the "lightning" appeared to occur over mountains and thus indicated that the electrical disturbances may have been produced by volcanic eruptions.

Venus alive with lightning and ac-

tive volcanoes? Nonsense, concluded two scientists who have completed a thorough analysis of data from spacecraft exploring Venus. They said the volcanic theory promoted in recent years was erroneous and a "disservice to the planetary literature."

In a report published in the current issue of the journal *Science*, Harry Taylor Jr., a senior scientist at the Goddard Space Flight Center in Greenbelt, Md., and Paul Cloutier of Rice University in Houston said their

Study of data from the American Pioneer Venus spacecraft showed that the signals attributed to lightning were not clustered over mountains. They said they believe the signals were produced by electrical disturbances generated by charged particles from the sun interacting with the planet's ionosphere.

"It should never have been interpreted as lightning signals," Dr. Taylor said.

The scientists said there was "no geological evidence for current active volcanism at Venus."